Middle Middle Miocene Aggradational (MM7 A1) Play

***Cibicides opima* through *Bigenerina humblei* biozones**

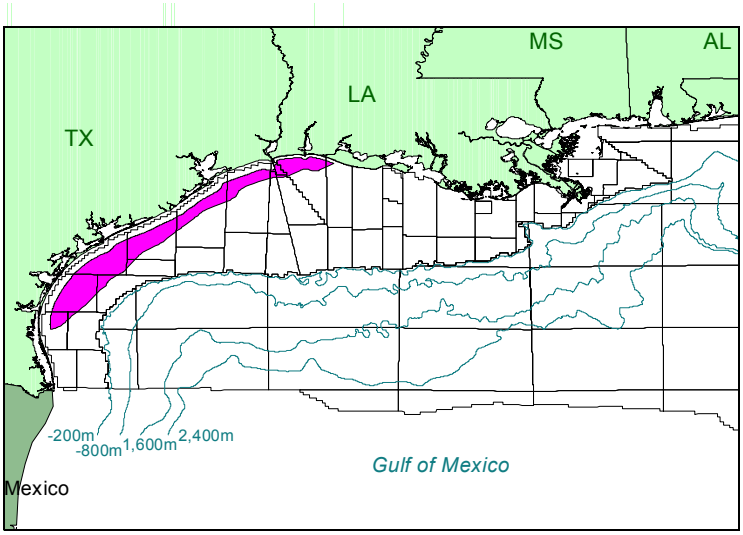

Figure 1. Play location.

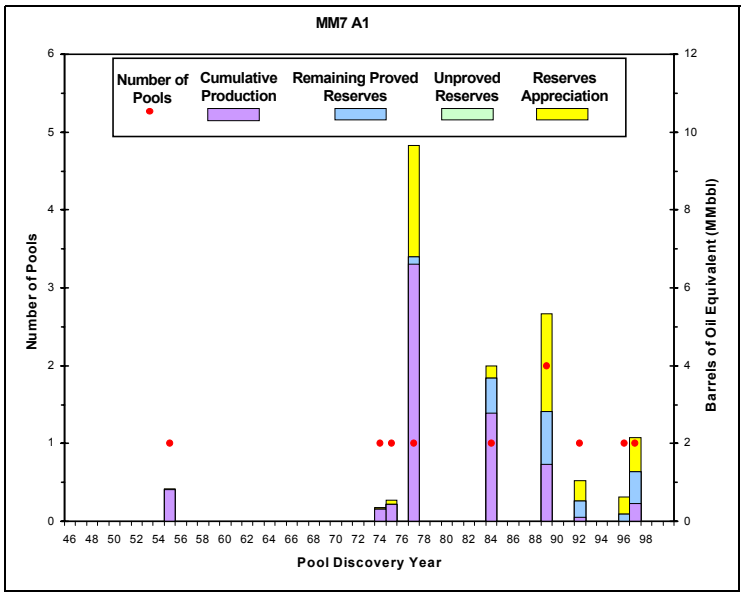

Figure 2. Exploration history graph showing reserves addition and number of pool discoveries by year.

MM7 A1 Play **10 Pools 22 Sands**	**Minimum**	**Mean**	**Maximum**
Water depth (feet)	32	60	88
Subsea depth (feet)	3092	5350	7369
Number of sands per pool	1	2	6
Porosity	27%	32%	36%
Water saturation	17%	23%	34%

Table 1. Pool attributes. Values are volume-weighted averages of individual reservoir attributes.

Play Description

The established Middle Middle Miocene Aggradational (MM7 A1) play occurs within the *Cibicides opima, Cristellaria* "I," and *Bigenerina humblei* biozones. This play extends from the North Padre Island Area offshore Texas to the East Cameron Area offshore Louisiana (figure 1).

Updip, the play continues onshore into Texas and Louisiana. To the east, west and downdip, the play grades into the sediments of the Middle Middle Miocene Progradational (MM7 P1) play and the Middle Middle Miocene Retrogradational (MM7 R1) play.

Play Characteristics

The MM7 A1 play is characterized by stacked, sand-dominated successions representing sediment buildup in fluvial channel/levee complexes, crevasse splays, and point bars; in deltaic distributary channel/levee complexes, crevasse splays, distributary mouth bars, bay fill, beaches, and barrier islands; and in shallow marine shelf delta fringes and slumps. These sands are often coarse grained and exhibit a blocky log signature that may show an upward-fining character at the top.

In the productive areas, the MM7 A1 play often comprises a significant portion of the MM7 section in terms of not only net sand development but also total MM7 section thickness. Across the Texas offshore, the MM7 aggradational interval varies from approximately 50 feet to more than 4,600 feet in thickness, with net sand thicknesses of as much as 1,400 feet. In the more limited offshore Louisiana area, the interval varies from approximately 400 to more than 1,800 feet in thickness, with net sand thicknesses of as much as 600 feet.

Most fields in MM7 A1 are structurally associated with simple

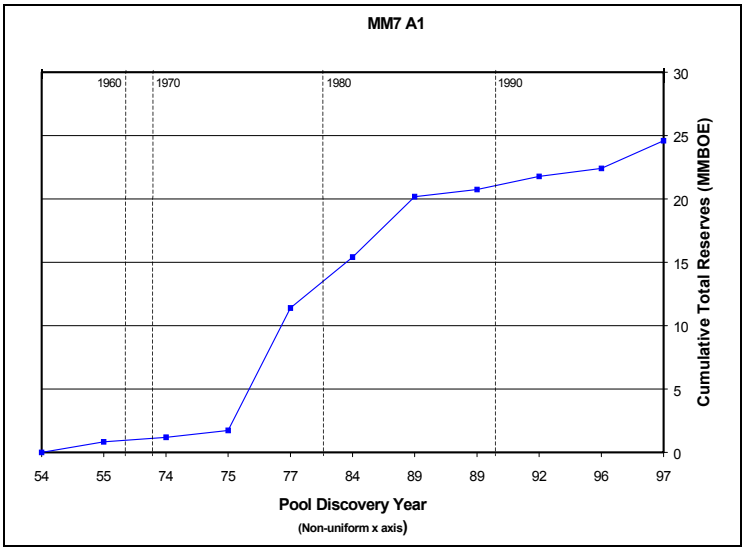

Figure 3. Plot of pools showing cumulative reserves by discovery order. Note the non-uniform x axis.

MM7 A1 Play Marginal Probability = 1.00	Number of Pools	Oil (Bbbl)	Gas (Tcf)	BOE (Bbbl)
Reserves				
Original proved	10	0.001	0.092	0.017
Cumulative production	--	<0.001	0.070	0.013
Remaining proved	--	<0.001	0.021	0.004
Unproved	0	0.000	0.000	0.000
Appreciation (P & U)	--	<0.001	0.043	0.008
Undiscovered Conventionally Recoverable Resources				
95th percentile	--	<0.001	0.042	0.008
Mean	10	0.002	0.072	0.015
5th percentile	--	0.006	0.113	0.024
Total Endowment				
95th percentile	--	0.001	0.176	0.033
Mean	20	0.003	0.206	0.040
5th percentile	--	0.007	0.247	0.049

Table 2. Assessment results for reserves, undiscovered conventionally recoverable resources, and total endowment.

anticlines and normal faults or, less commonly, with growth fault anticlines. Seals are provided by the juxtaposition of reservoir sands with shales, either structurally (e.g., faulting) or stratigraphically (e.g., lateral shale-outs, overlying shales).

Discoveries

The MM7 A1 gas play contains total reserves of 0.001 Bbo and 0.134 Tcfg (0.025 BBOE), of which <0.001 Bbo and 0.070 Tcfg (0.013 BBOE) have been produced. The play contains 22 producible sands in 10 pools (table 1; refer to the Methodology section for a discussion of reservoirs, sands, and pools). The first reserves in the play were discovered in the West Cameron 45 field in 1955 (figure 2). After the West Cameron 45 pool was discovered, no new pools were found until 1974. Both the maximum yearly total reserves and the largest pool in the play were accounted for in 1977 with the discovery of the Matagorda Island 665 field (10 MMBOE; figures 2 and 3). Ninety-six percent of the play's cumulative production and 84 percent of the play's total reserves have come from pools discovered before 1990. The most recent pool discovery, prior to this study's cutoff date of January 1, 1999, was in 1997.

The ten discovered pools contain 25 reservoirs, of which 22 are nonassociated gas, 2 are undersaturated oil, and 1 is saturated oil. Cumulative production has consisted of 96 percent gas and 4 percent oil.

Assessment Results

The marginal probability of hydrocarbons for the MM7 A1 play is 1.00. The play has a mean total endowment of 0.003 Bbo and 0.206 Tcfg (0.040 BBOE) (table 2). Thirty-three percent of this BOE mean total endowment has been produced.

Assessment results indicate that undiscovered conventionally recoverable resources (UCRR) have a range of <0.001 to 0.006 Bbo and 0.042 to 0.113 Tcfg at the 95th and

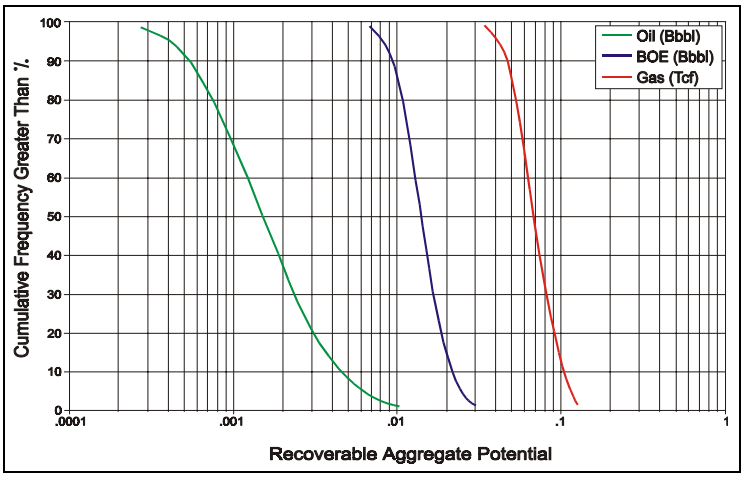

Figure 4. Cumulative probability distribution for undiscovered conventionally recoverable resources.

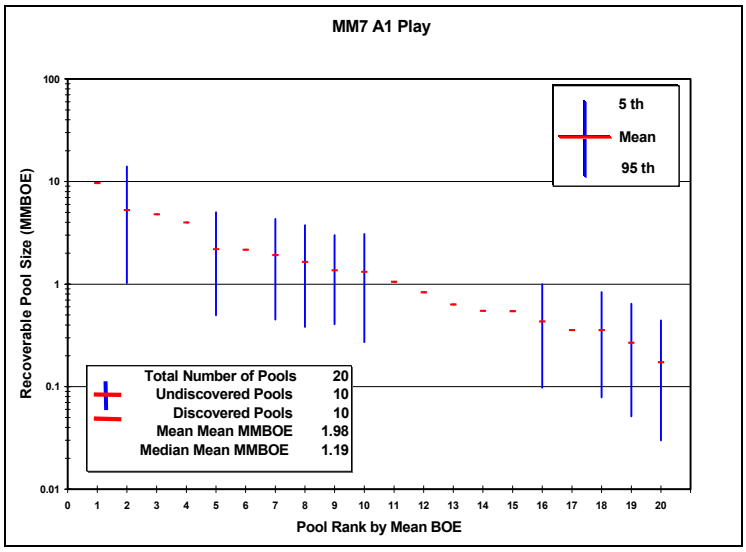

Figure 5. Pool rank plot showing the number of discovered pools (red lines) and the number of pools forecast as remaining to be discovered (blue bars).

5th percentiles, respectively (figure 4). Mean UCRR are estimated at 0.002 Bbo and 0.0.072 Tcfg (0.015 BBOE). These undiscovered resources might occur in as many as 10 pools. The largest undiscovered pool, with a mean size of 5 MMBOE, is forecast as the second largest pool in the play (figure 5). The forecast places the next four largest undiscovered pools in positions 5, 7, 8, and 9 on the pool rank plot. For all the undiscovered pools in the MM7 A1 play, the mean mean size is 1 MMBOE, which is smaller than the 2 MMBOE mean size of the discovered pools.

BOE mean UCRR contribute 38 percent to the play's BOE mean total endowment. Discoveries will continue to be made in and around existing fields by drilling small, subtle structures as economics warrant.